



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,694	06/19/2006	Juliana G. Serafin	62397A	7169
109 7590 05/02/2008 The Dow Chemical Company Intellectual Property Section P.O. Box 1967 Midland, MI 48641-1967				
EXAMINER ZIMMER, ANTHONY J				
ART UNIT 1793		PAPER NUMBER		
MAIL DATE 05/02/2008		DELIVERY MODE PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/573,694

**Applicant(s)**

SERAFIN ET AL.

**Examiner**

ANTHONY J. ZIMMER

**Art Unit**

1793

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-177 is/are pending in the application.
- 4a) Of the above claim(s) 23-129, 144-158 and 168-177 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-22, 130-143, and 159-167 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 10/5/2007, 7/30/2007, 4/17/2007, 6/19/2006
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_



## DETAILED ACTION

### *Election/Restrictions*

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 1, 4-22, 130-143, and 159-167, drawn to a catalyst.

Group 2, claim(s) 23-44, 46-88, 90-116, 144-150, and 168-177, drawn to a method for epoxidation of an olefin.

Group 3, claim(s) 45, 89, and 151, drawn to a process for the production of a 1,2-diol.

Group 4, claim(s) 117-129 and 152-158, drawn to a carrier and a process for the production of a carrier.

The inventions listed as Groups 1-4 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Group 3 lacks a common technical feature with all of the other groups. In this case lack of unity is evident *a priori*. In particular, the process of Group 3, produces a 1,2 diol from an olefin oxide. The claims recite that the olefin oxide reactant used to make the 1,2 diol was made in a process involving the catalyst of the instant invention. However, this is a product by process limitation, and since an olefin oxide can be made by a process that uses a different catalyst, carrier (and process of making a carrier), and a different process of epoxidation than that of the instant invention (as shown by applicant in the Background section spanning instant pp. 1-4), there is no common technical feature between these groups. Thus, the groups of claims lack unity.

Groups 1 and 2 have a common technical feature, which is silver deposited on a carrier (as the other features common to the independent claims of group 1 are not present in the features common to the independent claims of group 2). However, this common technical feature is not considered a special technical feature as it is found in the prior art. In particular, the prior art references mentioned in instant pp. 1-4, teach a

Art Unit: 1793

carrier supporting a silver catalyst. Thus, since groups 1 and 2 do not have a common special technical feature, they lack unity.

The common technical feature between Groups 1 and 4 is a carrier (as the other features common to the independent claims of group 1 are not present in the features common to the independent claims of group 4); however, carriers are well known in the art. Thus the common technical feature is not considered to be a special technical feature, and thus the Groups lack unity.

The common technical feature between Groups 2 and 4 is a carrier (as the other features common to the independent claims of group 2 are not present in the features common to the independent claims of group 4); however, carriers are well known in the art. Thus the common technical feature is not considered to be a special technical feature, and thus the Groups lack unity.

During a telephone conversation with Lois Ruszala on 17 April 2008 a provisional election was made without traverse to prosecute the invention of Group 1, claims 1, 4-22, 130-143, and 159-167. Affirmation of this election must be made by applicant in replying to this Office action. Claims 23-129, 144-158, and 168-177 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

Art Unit: 1793

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 130-143 and 165 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It should be noted that with respect to newly added claims, applicant should specifically point out the support for any amendments made to the disclosure. See MPEP 2163.

In addressing the following claims it should be noted that support was not found in the disclosure as originally filed for the subject matter presented below as claimed. In certain situations, species implied by a limitation may be supported (i.e. although "high selectivity dopant" does not have support in the original disclosure, rhenium does), but as presented below, the limitations referred to do not have support as claimed. Many of these added limitations claim and disclose benefits or results not supported by the original disclosure.

In regard to claims 130 and 137, the examiner was unable to locate support for "fluoride-mineralized carrier" or "strength-enhancing additive" in the disclosure as originally filed.

In regard to claim 131, support for nickel could not be found in the original disclosure.

In regard to claims 133-135, 138, and 143 a zirconium species was not referred to as "strength-enhancing additive" in the original disclosure (such a reference implies an added advantage not disclosed in the original disclosure). Support for lanthanide species, Group II metal species (including calcium), inorganic glass, and cerium as being additives to the support could not be found in the original disclosure.

In regard to claim 139, support for "high selectivity dopant" could not be found in the disclosure as originally filed.

In regard to claims 141 and 165, support for "rhenium co-promoter" could not be found in the disclosure as originally filed.

In regard to claim 142, support for carrier having a "particulate matrix" could not be found in the disclosure as originally filed.

Claims 132, 136, and 140 are rejected as being dependent on claims containing new matter.

Claims 130-141 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "fluoride-mineralized carrier" in claims 130 and 137 renders the claim indefinite, because it is indefinite what kind of carrier qualifies as a fluoride-mineralized carrier. For instance, a carrier produced using fluoride ions could be considered a fluoride-mineralized carrier (most of the fluoride is vaporized in the process), or fluoride

ions could be introduced into the carrier. The term "fluoride-mineralized carrier" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. All dependent claims are rendered indefinite as a result. The examiner will interpret "fluoride mineralized carrier" as encompassing carriers made using fluoride ions and/or carriers with fluoride ions introduced into the carrier.

The term "high selectivity" in claim 139 is a relative term which renders the claim indefinite. The term "high selectivity" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Furthermore, it is indefinite, and the specification does not define what is encompassed within the term "high selectivity dopant". The term "high selectivity dopant" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 130-134, 136-138, and 140 rejected under 35 U.S.C. 102(b) as being anticipated by Cheung (US2001/0046943).



Cheung teaches silver supported on an alpha alumina carrier that contains calcium (a strength-enhancing additive), and is impregnated with potassium fluoride (and thus is "fluoride-mineralized" and contains a Group IA metal component). See [0158]-[0161] and [0139]-[0144].

***Claim Rejections - 35 USC § 102/103***

The text of those sections of Title 35, U.S. Code not included here in this action can be found elsewhere in this Office action.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-9, and 19-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Buffum '824.

In regard to claims 1 and 20-22, Buffum teaches a catalyst for the manufacture of ethylene oxide (an alkylene oxide) by the vapor phase epoxidation of ethylene oxide. See column 5, lines 55-63. In particular the catalyst comprises silver and efficiency-enhancing promoters including alkali metals, rhenium, and a co-promoter (see column 4, line 66 – column 5, line 17) supported on a refractory solid support (alumina) (see column 2, lines 15-41) containing 0.1-10% zirconium silicate (this is the composition before firing). See column 2, lines 59 – column 3, line 18; and Table 5, Carriers J and R-W. Though Buffum is silent in regard to the composition comprising zirconium silicate in

the final product, the carriers are fired at temperatures in the range of 1393-1413°C (see Table 4), temperatures well below the temperature of decomposition of zircon to zirconia (1540°C see instant page 8, lines 27-29). Thus the end composition of zircon in the carrier after firing would necessarily be substantially similar to the starting composition, thus meeting the limitations of claim 1 (Seen as a sufficient amount of zirconium component to enhance at least one of catalytic activity, efficiency, and stability as compared to a similar catalyst which does not contain the zirconium component because the compositional range is the same as that on instant page 8, line 12; present in the support substantially as zirconium silicate) and falling in the ranges required by claims 20-22.

In regard to claims 4-6, Buffum teaches 5-20 wt % silver. See column 5, lines 18-21.

In regard to claims 7-9, Buffum teaches lithium sulfate and lithium nitrate (alkali metal compound and member of a redox-half reaction pair), and ammonium perrhenate (an oxyanion of an element (rhenium) having an atomic number and in a group within the ranges required by claim 7). See column 9, line 23- column 10, line 55.

In regard to claim 19, Buffum teaches a solid support having a surface area of at least 0.5 m<sup>2</sup>/g and a pore volume of at least 0.5 cc/g, see Carriers R and U-W in Table 4. Buffum does not teach the median pore diameter. However, since the surface area, pore volume, and composition (see above) of these supports are substantially similar to instant invention, the other properties of the solid support of Buffum would also be substantially similar, and would thus have a median pore diameter falling within the

range required by the claim. Furthermore, Carrier A is found to have a median pore diameter of 4.6 microns, which falls in the range of the claim. See Column 7, line 55 and MPEP 2112.01. Since Carriers R and U-W are similar to Carrier A in composition and have a similar process of making; the median pore diameters of carriers R and U-W would also be similar to that of Carrier A and fall in the range required by the claim.

Claims 10, 14, and 18 are rejected under 35 U.S.C. 102(b) as anticipated by Buffum '824 or, in the alternative, under 35 U.S.C. 103(a) as obvious over Buffum '824 in view of Weber '134.

In regard to claim 10, Buffum teaches a catalyst support containing at least 95% alpha alumina exclusive of the zirconium component (see Carrier J on Table 5, wherein the zirconia and zirconium silicate make up the zirconium component and exclusive of the zirconium component 99.5% of the support is alpha alumina or Carrier U with 99.3% alpha alumina). [For Carrier J, On the basis of 100 g, alumina comprises 98.42 g and the non-zirconium component is 0.47 g thus alumina comprises  $(98.42)/(98.42 + 0.47) * 100\% = 99.5\%$ .] .

In regard to claim 14, Buffum teaches a catalyst support containing at least 99% alpha alumina exclusive of the zirconium component (see Carriers R and S on Table 5, respectively wherein exclusive of the zirconium component 99.6% and 99.3% of the support is alpha alumina). [Calculated similar to the calculations above.] Carriers R and S of Table 5 also contain no alkaline earth metal other than calcium.

The above cited percentages of alpha alumina do not take impurities into account. However, typically impurities in alpha alumina comprise a proportion of the catalyst on the order of parts per million. See evidentiary document, Thorsteinson '140, Table 2. Thus, the percentage of impurities in the alumina of Buffum would not cause the percentage of alpha alumina to be out of the ranges required by the claims.

In the event that the impurities do cause the percentage of alumina to be sufficiently low as to not fall in the range required by the claim, it would have been obvious to one of ordinary skill in the art to modify Buffum with Weber because Weber teaches an alpha alumina like that used in Buffum, and in particular teaches using as pure a carrier as possible in order minimize detrimental reactions involving impurities. See column 1, lines 16-25. Thus it would have been obvious to one of ordinary skill in the art to use the purest alpha alumina possible (near 100% and in the range of the claims), or to purify an alpha alumina, in order to affect the predictable result of minimizing detrimental reactions involving the impurities.

In regard to claim 18, Buffum is silent in regard to the morphology of the solid support. However, since the solid support of Buffum has a substantially similar composition to that of the instant application (see above 102/103 rejection of claim 1), and in particular contains a large percentage of alpha alumina similar to the instant application, and has substantially similar pore volume and surface area as the instant invention (see 102/103 rejection of claim 19 above), the other properties of the solid support of Buffum would also be substantially similar including the morphology. See MPEP 2112.01.

Claims 142-143, and 166 are rejected under 35 U.S.C. 102(b) as anticipated by Buffum '824, in the alternative, under 35 U.S.C. 103(a) as obvious over Buffum '824 in view of Thorsteinson '140.

In regard to claims 142-143 and 166, the catalyst of Buffum comprises a silver catalyst with a carrier containing zirconium silicate (a zirconium species that is considered to be the strength-enhancing additive). See 102/103 rejection of claim 1 above.

Buffum is silent in regard to the morphology of the solid support. However, since the solid support of Buffum has a substantially similar composition to that of the instant application (see above 102/103 rejection of claim 1), and in particular contains a large percentage of alpha alumina like the instant application, and has substantially similar pore volume and surface area as the instant invention (see 102/103 rejection of claim 19 above), the other properties of the solid support of Buffum would also be substantially similar including the morphology. See MPEP 2112.01.

In the event that the carrier of Buffum does not have the required morphology, it would have been obvious to one of ordinary skill in the art to modify Buffum in view of Thorsteinson because Thorsteinson teaches a silver catalyst supported on an alumina carrier used in the exoxidation of an olefin like the invention of Buffum. See abstract of Thorsteinson and column 8, lines 1-59. In particular, Thorsteinson teaches using a carrier comprising alumina that has [a particulate matrix of] lamellate or platelet-type (interlocking platelet) morphology. See column 8, lines 43-59. One of ordinary skill in the

art would have found it obvious to substitute the alumina of Thorsteinson for the alumina of Buffum in order to affect the predictable result of forming an epoxidation catalyst of a silver catalyst on an alumina support.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buffum '824 in view of Weber '134.

In regard to claims 10-12, see above 102/103 rejection for the limitations of claim 10, Carriers J and U-W of Table 5 also contain no calcium additive.

In regard to claim 13, see above 102/103 rejection for the limitations of claim 10, Carriers R-T of Table 5 also do not contain any alkaline earth metal additive other than calcium.

In regard to claims 15-16, see above 102/103 rejection for the limitations of claim 14. Carriers J and U-W of Table 5 also contain no calcium and meet the limitation of claim 14.

In regard to claims 17, see above 102/103 rejection for the limitations of claim 14. Carriers R and S of Table 5 also contain no alkaline earth metal additive other than calcium.

Buffum is silent in regard to the impurity content of the alpha alumina. However, it would have been obvious to one of ordinary skill in the art to modify Buffum with Weber because Weber teaches an alpha alumina like that used in Buffum, and in particular teaches using as pure a carrier as possible in order minimize detrimental reactions involving impurities. See column 1, lines 16-25. Thus it would have been obvious to one of ordinary skill in the art to use the purest alpha alumina possible (with near 0% impurities (of any alkaline earth metal) and falling in the ranges of the claims), or to purify an alpha alumina, in order to affect the predictable result of minimizing detrimental reaction involving the impurities.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buffum '824 (alternatively in view of Weber as applied to claim 14 above) further in view of Thorsteinson '140.

Buffum (and Weber) are silent in regard to the morphology required by the claim. In the event that the carrier of Buffum does not have the required morphology, it would have been obvious to one of ordinary skill in the art to modify Buffum in view of

Thorsteinson because Thorsteinson teaches a silver catalyst supported on an alumina carrier used in the epoxidation of an olefin like the invention of Buffum. See abstract of Thorsteinson and column 8, lines 1-59. In particular, Thorsteinson teaches using a carrier comprising alumina that has [a particulate matrix of] lamellate or platelet-type (interlocking platelet) morphology. See column 8, lines 43-59. One of ordinary skill in the art would have found it obvious to substitute the alumina of Thorsteinson for the alumina of Buffum in order to affect the predictable result of forming an epoxidation catalyst of a silver catalyst on an alumina support.

Claims 130-141 rejected under 35 U.S.C. 103(a) as being unpatentable over Matusz '075 in view of Thorsteinson '140.

In regard to claims 130-138, Matusz teaches silver deposited on carrier including alpha alumina carriers (see column 3, lines 12-22 and column 4, lines 29-53) which has been pre-doped or pre-impregnated (see column 6, lines 59-64), thus incorporating the species therein, with a rare earth metal, including cerium (see column 7, lines 51-62 and column 24, lines 45-62), and an alkaline earth metal, including calcium (see column 8, lines 64-67) (strength-enhancing additives).

In regard to claims 139-141, Matusz teaches a catalyst comprising an alkali metal, rhenium and a rhenium co-promoter (high selectivity dopant). See column 3, lines 12-22.

Matusz does not teach the carrier being fluoride mineralized. However, it would have been obvious to one of ordinary skill in the art to modify Matusz with Thorsteinson



Art Unit: 1793

because Thorsteinson teaches a silver catalyst on an alumina carrier used in the epoxidation of an olefin like that of Matusz, and in particular teaches adding a fluorine compound (containing fluoride ions) to the carrier in order to provide a fluoride mineralized carrier that has increased performance, and particularly increased stability. See Thorsteinson column 8, line 43 – column 9, line 6. Using the known technique of adding fluoride ions to a catalyst carrier (alpha alumina in particular) in order to provide a fluoride-mineralized carrier that has improved performance and stability to improve performance and stability of the catalyst of Matusz would have been obvious to one of ordinary skill in the art.

Claims 142-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thorsteinson '140.

Thorsteinson teaches a catalyst comprising silver as a catalytic species deposited on a carrier having a [particulate matrix] a lamellar of platelet-type morphology. See column 7, line 40-51 and column 8, line 43-59. Thorsteinson also teaches that calcium (strength-enhancing additive) is present in the supports. See Table 2, supports D, G, J-N, Q, and T. Since this is a product claim, the use of "additive" is a product-by-process limitation. The limitation does not require that the substance be added in an addition step because even though product-by-process steps are limited by and defined by the process, determination of patentability is based on the product itself. See MPEP 2113. The use of the term "additive" only requires that the particular substance added be present in the product. Since calcium (a Group II metal species) is

present in the product, the limitation of the support containing a strength-enhancing additive (a Group II metal species) is met.

Claims 159-167 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buffum '824 in view of Thorsteinson '140, Weber '134, and Jin '195.

In regard to claims 159 and 161, Buffum teaches a catalyst comprising silver as a catalytic species disposed on an alpha-alumina carrier having incorporated therein a zirconium component that is present substantially as zirconium silicate. See 102/103 rejection of claim 1 above. Buffum fails to teach the limitation of "alpha-alumina is prepared by a process comprising the step of contacting an alpha-alumina precursor with fluoride ions." This limitation is a product-by-process limitation. Even though product-by-process limitations are limited by the process, determination of patentability is based on the product itself. The structure implied by the process steps should be considered. See MPEP 2113. In particular, the apparent structural limitation provided by this limitation is that the product contains fluoride ions.

It would have been obvious to one of ordinary skill in the art to modify Buffum in view of Thorsteinson because Thorsteinson teaches a silver catalyst on an alpha alumina carrier used in the epoxidation of an olefin like that of Buffum; but teaches using a carrier containing a fluorine containing substance (with fluoride ions and prepared using fluoride ions, see the ionic compounds used in column 9, lines 1-3) in order to improve performance and stability. See column 8, line 43 – column 9, line 6. Using the known technique of improving the stability and performance of a catalyst by

using a fluoride ion containing carrier (one comprising alpha-alumina as known in the art such as those provided in Weber or Jin, see abstracts of both) as the carrier of Buffum would have been obvious to one of ordinary skill in the art.

In regard to claims 160, 162 the product-by-process limitations imply apparent structural limitations of the product carrier comprising alpha-alumina, fluoride, and zirconium silicate. These structural limitations are discussed above.

It is possible that in addition to incorporating fluoride ions, the production process involving fluoride ions has structural implications on the alumina particles. However, since the process of preparing alpha alumina in Weber or Jin is substantially similar to the process of claims 160 and 162 (excluding the addition of zirconium silicate); other structural limitations of the alpha alumina such as morphology, pore size, specific surface area, and pore volume would also be substantially similar; as the inclusion of a small proportion of zirconium silicate has little or no effect on these properties of the alumina particles in the processes of claims 160 and 162 since it has not participated in reactions forming alpha alumina (evidenced by the presence of zirconium silicate in the product after the alpha alumina forming process is complete). See MPEP 2112.01. The processes are particularly similar in that they all peptize alumina using an acid and fluoride ions, followed by drying and calcination. See abstract of Weber and Example 1 of Jin. Thus, any structural limitations of the alumina particles implied by the product-by process limitations of claims 159-162 are also rendered obvious.

In regard to claim 166 and 167, claim 167 contains the same structural limitations implied by the process steps as claims 160 and 162, which are discussed above. Claim

Art Unit: 1793

167 contains the additional limitation that the alumina particles have at least one substantially major surface having a lamellate or platelet morphology. Similar to the argument above, since the process of preparing alpha alumina in Weber or Jin is substantially similar to the process of claim 167 (excluding the addition of zirconium silicate); other structural limitations such as the morphology of the alpha alumina would also be substantially similar; as the inclusion of a small proportion of zirconium silicate has little or no effect on these properties since it does not participated in reactions forming alpha alumina (evidenced by the presence of zirconium silicate in the product after the alpha alumina forming process is complete). See MPEP 2112.01. The processes are particularly similar in that they all peptize alumina using an acid and fluoride ions. See abstract of Weber and Example 1 of Jin. Thus the morphology of the alpha alumina particles would be substantially similar, and have the morphology required by the claims.

In regard to claims 163-165, Buffum teaches lithium sulfate and lithium nitrate (comprising a Group 1A cation and member of a redox-half reaction pair comprising nitrate), and ammonium perrenate (a rhenium compound/component). See column 9, line 23- column 10, line 55 of Buffum.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz

/Steven Bos/  
Primary Examiner, Art Unit 1793